

"WATER, WATER EVERYWHERE, AND NOT A DROP TO DRINK" OR CAN YOU SURVIVE A FLOOD?

GRADES 6-8
GEORGE DURRETT

TIME ALLOTMENT:

Two 45-minute class periods

OVERVIEW:

Water is basic to all life on the planet, but what happens when atmospheric and developmental conditions cause the water to rise beyond safe limits? Since Noah's ark we have understood the catastrophic effects of floods; whether they are caused by ocean storms, broken dams, or swollen rivers, lives have been lost and property severely damaged. Why do people choose to live with this risk? These and many more questions will be answered.

Through the activities in this lesson students will become familiar with floods, what causes them, how the government has helped, and the best precautions to take in order to survive. After examining Web sites and viewing the video clips, students will design a safety plan for possible flooding.

SUBJECT MATTER:

Science

LEARNING OBJECTIVES:

Students will be able to:

- Explain the various causes of floods.
- Identify areas that are at risk.
- Understand that floods are natural and manmade disasters.
- Plan for the safest way to prepare for potential flooding.
- Describe the ways that FEMA helps flood victims.


STANDARDS:
National Science Education Standards

<http://www.nap.edu/readingroom/books/nses/html/>

Science and Technology
CONTENT STANDARD E:

As a result of activities in grades 5-8, all students should develop

- Abilities of technological design
- Understandings about science and technology

Science in Personal and Social Perspectives
CONTENT STANDARD F:

As a result of activities in grades 5-8, all students should develop understanding of

- Personal health
- Populations, resources, and environments
- Natural hazards
- Risks and benefits
- Science and technology in society

Louisiana Science Frameworks:

State Standards for Curriculum Development

<http://www.doe.state.la.us/doe/assessment/standards/SCIENCE.pdf>

Science and the Environment - In learning environmental science, students will develop an appreciation of the natural environment, learn the importance of environmental quality, and acquire a sense of stewardship. As consumers and citizens, they will be able to recognize how our personal, professional, and political actions affect the natural world.

Benchmarks

ESS-M-A11: Understanding that the atmosphere interacts with the hydrosphere to affect weather and climate conditions;

SI-M-A5: Developing models and predictions using the relationships between data and explanations;

SI-M-A7: Communicating scientific procedures, information, and explanations;

SE-M-A4: Understanding that human actions can create risks and consequences in the environment.

MEDIA COMPONENT:**Video:**

Enviro-Tacklebox™ — *Forces of Floods* (Louisiana Public Broadcasting) This video introduces students to the dangers of floods and the importance of being prepared.

Web sites:**Enviro-Tacklebox™**

<http://www.envirotacklebox.org> This is Louisiana Public Broadcasting's Web site providing teaching information, streaming media, and student activities involving environmental science. RealOne Player is used to view the video and can be downloaded from the Web site.

National Center for Environmental Health <http://www.cdc.gov/nceh/hsb/extreme.htm> This Web site offers ways to protect yourself against many types of extreme conditions.

PBS: Nova <http://www.pbs.org/wgbh/nova/flood/water.html> Go to this Web site to obtain information on floods and download photo.

MATERIALS:*Per Each Student:*

- Pencil and paper
- Questions for viewing the video

Per Each Group of Four to Five Students:

- Two plastic containers
- Water
- Dirt
- Beans
- Plastic insects or a something that can simulate them
- Plant bits and pieces

Per Group :

- Video: **Enviro-Tacklebox™—*Forces of Floods***

PREP FOR TEACHERS:

1. Prior to teaching this lesson, bookmark the Web sites used in the lesson on each computer in your classroom view video, and download picture.
2. Prepare the hands-on element of the lesson by: Distributing the materials to each group.

INTRODUCTORY ACTIVITY:

1. Show the class a picture of a flooded area. Ask them what is happening in the picture. Ask them if they have ever encountered a flood. Answers will vary from students who have really experienced a serious flood to students who have just played in ditches swollen by a heavy rain.
2. Tell the students to look at the materials before them. Explain that the dirt represents silt, the beans represent sewage, the plant pieces represent trees, crops, etc., and the plastic insects represent critters of all kinds that can be displaced in a flood.
(Guide the students to realize that flood conditions usually do not happen very often. When they do happen, we need to know the physical dangers that can exist. Maybe those ditches they have been playing in are not as safe as they appear.)

- Instruct students to keep one container clean and only add materials to the other container. Tell the students that the big waters are coming. What would be the first thing the waters will take with them? *Suggest that silt may be the initial substance for rivers or streams.* Have the students dribble some dirt in one container. Ask the students what they think will be the next ingredient to the floodwaters. *Suggest that anything underground will be affected.* Sewage is underground. Add some beans to the contaminated container. As the waters rise, what would be the next item to be affected? Guide the students to think about the number of insects and animals that live in the ground. Add critters to the contaminated water. Last, what will the floods wash away and destroy? *Crops, trees, and anything above ground will go. Add the plant pieces to the contaminated water.*

Compare the container of clean water to the container of floodwater. Discuss with your students whether or not this is a safe environment in which to play. They need to learn about appropriate precautions for floods.

LEARNING ACTIVITIES:

When using media, provide students with a **FOCUS FOR MEDIA INTERACTION**, a specific task to complete and/or information to identify during or after viewing of video segments, Web sites, or other multimedia elements.

- Ask your students what they know about preparing for floods. Answers will include the fact that they should not play in floodwaters. Students that have been in floods may have good advice.
- Explain to your students that it is important to know the conditions that cause floods so that they can be prepared when it happens. Guide them to understand that a number of different situations may cause flooding. Tell them that they are about to watch a segment of **Enviro-Tacklebox™ — Forces of Floods** that will inform them about the causes of floods and what we can do to protect ourselves.
- Insert **Enviro-Tacklebox™ — Forces of Floods** into your VCR. Provide your students with a **FOCUS FOR MEDIA INTERACTION**, asking them to answer the following questions.

- What is a watershed?
- How can seasonal floods be beneficial?

Start the tape at the beginning and pause the tape after Greg, the host says disaster. This segment is approximately one and a half minutes long.

Check for comprehension. (**Answers: 1. A watershed is land that naturally drains into a river. 2. Seasonal floods can be beneficial when they deposit rich soil and flood rice fields.**)

- Tell your students they are about to watch another segment of **Enviro-Tacklebox™ — Forces of Floods**. Provide students with a **FOCUS FOR MEDIA INTERACTION**, asking them to answer the following questions.
- What happened in Johnstown?
- What are the Missoula Floods?

Start the tape at the stopping point and play it until the big boulder of the Missoula floods appears. This segment is approximately two minutes long.

Check for comprehension. (**Answers: 3. At Johnstown an earthen dam that was not maintained properly broke. It flooded the town with twenty million tons of water. Hundreds of people were killed and injured. 4. The Missoula Floods occurred 15,000 years ago. A glacial lake broke through a dam of ice and carried enough silt with the floodwaters to create an enormous amount of fertile farmland. Guide the students to understand that these two events demonstrate the contrast between an enormous natural occurrence and an occurrence caused by the negligence of man.**)

- Tell the students they are about to watch another segment of **Enviro-Tacklebox™ — Forces of Floods**. Provide the students with a **FOCUS FOR MEDIA INTERACTION**, asking them to answer the following questions.
- What action by the national government was inspired by the 1927 flood of the Mississippi River?
- What are some of the tactics the Army Corps of Engineers uses when designing levees?
- Why was the Bonne Carre Spillway developed?

Start viewing the video at stopping point and stop at the view of the Mississippi River. This segment is approximately four minutes long.

Check for comprehension. (**Answers: 5. The national government passed the 1928 Flood Control Act. 6. They summoned the Army Corps of Engineers to build the longest levee system in the world. Levees were set back from the river to allow a natural flooding area when high waters occurred. 7. The Bonne Carre Spillway was already a natural flood plane. It was developed to handle the overflow when the Mississippi River became too swollen.**)

6. Tell the students they are about to watch the next segment of *Enviro-Tacklebox™ — Forces of Floods*. Provide a **FOCUS FOR MEDIA INTERACTION**, by asking the students to answer the following question.

8. How many states were affected in the Great Flood of 1993?
9. How was Valmeyer, Illinois affected?
10. What did people find in their homes when they were able to return?
11. How did the village of Valmeyer solve its problem?

Start the video at the stopping point and play until the water tower appears. This segment is approximately three minutes long.

Check for comprehension. (*Answers: 8. Nine states in the Midwest were affected by the Great Flood of 1993. 9. Valmeyer, Illinois was flooded with fourteen inches of water. Their village had been built in a natural flood plain. When the levees became saturated, they broke. 10. The people returned to their homes to find knee deep mud, silt, and corn stalks. 11. When the people started to rebuild, they choose a site with a higher elevation for their homes.*)

7. Tell the students they are about to watch the next segment of *Enviro-Tacklebox™ — Forces of Floods*. Provide a **FOCUS FOR MEDIA INTERACTION**, by asking the students to answer the following questions:

12. What is FEMA?
13. What is mitigation?
14. Who was called to save the horse and what did the owner realize?
15. What percent of all Presidentially-declared disasters are flood related?
16. How can you prepare for a flood?

Start viewing the video at the stopping point and play it through to the end. This segment is approximately five minutes long.

Check for understanding. (*Answers: 12. FEMA is the Federal Emergency Management Agency. They respond to and coordinate help in the event of disastrous floods. 13. Mitigation is the preparation done in order to reduce the chance of damage in case of a flood. 14. The owner of the horse called firefighters to save the animal. He learned that it is best to leave rescue efforts to the experts. 15. Ninety percent of all Presidentially-declared disasters are flood related. 16. You can prepare for a flood by doing the following:*

1. **Store:**
 - *fresh water*
 - *Battery powered radio and flashlight*
 - *Extra batteries*
 - *Manual can opener*
 - *Sand bags*
 - *Plastic sheeting*
2. *Make sure that every person in the house knows how to turn off the water and gas.*
3. *Check the back flow valve for the sewage line.*
4. *Move valuable items upstairs.*
5. *Tie down items left outside.*
6. *Never try to ride a bike or car through flood waters.*
7. *Check insurance policy for coverage.*
8. *Use a camera to take pictures of damage.)*

CULMINATING ACTIVITIES:

Have the students visit the following Web sites to gather information. Tell them to write a story that places them in a dangerous flood situation and explain how they mitigated their losses. They should include the flood vocabulary and information from the video. This may be done in groups or individually. Have the students present their stories to the class.

National Center for Environmental Health <http://www.cdc.gov/nceh/hsb/extreme.htm> This Web site offers ways to protect you against many types of extreme conditions. Go to Web site and click on Floods. Gather information about water quality, food safety, and sanitation and hygiene.

PBS: Nova <http://www.pbs.org/wgbh/nova/flood/water.html> Go to this Web site to obtain information on floods and download photo.

CROSS-CURRICULAR EXTENSIONS:**ART/PHOTOGRAPHY:**

- Search the Web for pictures of floods. Have the students make a collage of the pictures that will illustrate the dangers of extreme weather.

LANGUAGE ARTS/TECHNOLOGY/SCIENCE:

- Investigate the history of severe floods over the last century.

MATHEMATICS:

- Research the statistics on how often certain types of floods, such as flash floods, urban floods, and storm surges, occur.

COMMUNITY CONNECTIONS:

- Have a local meteorologist visit the class and explain how he or she predicts extreme weather.
- Take a field trip to a local weather station.
- Have a representative from the state police visit and explain how precautions are taken and what steps are followed in an evacuation.

STUDENT MATERIALS:

- Vocabulary
- Video questions
- Flood Preparation List

FLOOD VOCABULARY

Watershed Area - Land that naturally drains into a river, creek, or lake.

Levee - An earthen structure used for flood protection of lands adjacent to a river.

Project Design Flood - Planning for the safety of structures up to twenty percent above the flood levels reached in 1927.

Mitigate - Plan ahead to reduce possible damage.

Storm Surge - When an offshore storm forces flood waters on land.

Flash Flood - When rain is so heavy that the ground does not have time to absorb it and floods occur.

Urban Flooding - When undeveloped areas are paved over and there is not enough ground to absorb the water.



VIDEO QUESTIONS

1. What is a watershed?
2. How can seasonal floods be beneficial?
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6. What are some of the tactics the Army Corps of Engineers uses when designing levees?
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12. What is FEMA?
13. What is mitigation?
14. Who was called to save the horse and what did the owner realize?
15. What percent of all Presidentially-declared disasters are flood related?
16. How can you prepare for a flood?

FLOOD PREPARATION LIST

1. *Store:*
 - *fresh water*
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 - *Extra batteries*
 - *Manual can opener*
 - *Sand bags*
 - *Plastic sheeting*
2. *Make sure that every person in the house knows how to turn off the water and gas.*
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